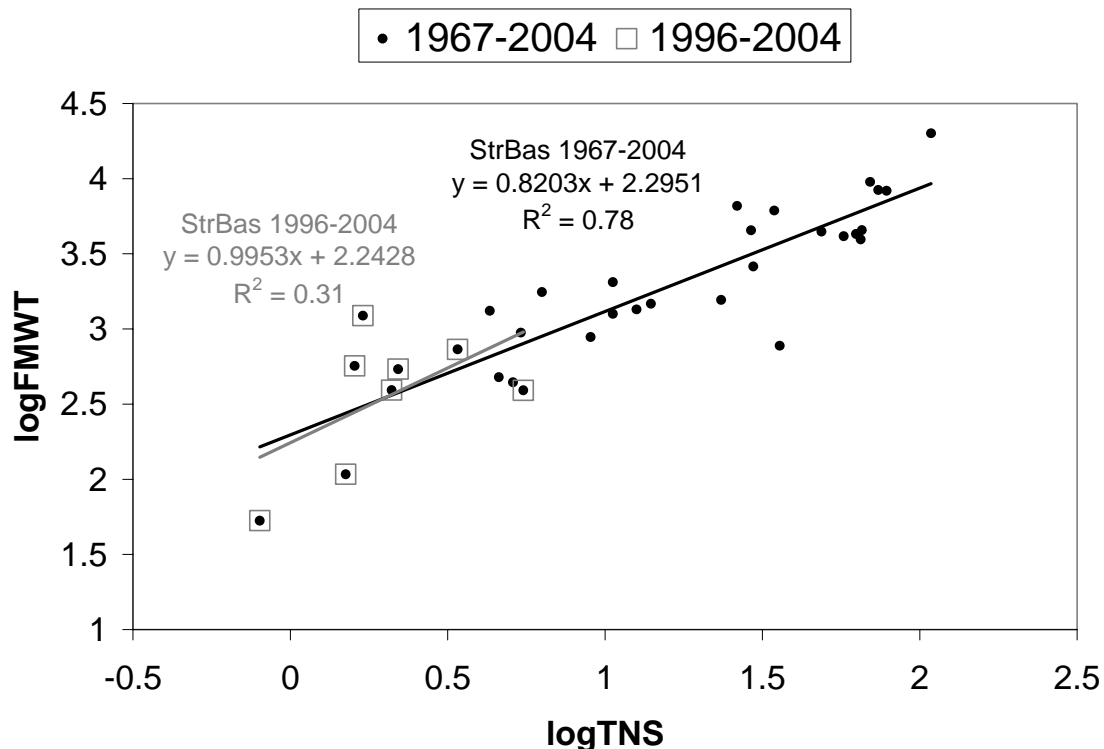


A Contribution to Analyses of Existing Data/Historical Population Trends

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The pelagic organism decline was hypothesized based on evaluation of IEP abundance indices; in particular the DFG Fall Midwater Trawl (FMWT). This fall, DFG is evaluating FMWT catch efficiency by putting a second, finer-mesh cod-end on the trawl net. This will provide information on what size range of delta smelt and other fishes are collected efficiently by the program. There is also the issue of changed gear efficiency when fish abundances are low. Recently, Kimmerer and Nobriga (in press) used resampling techniques to generate confidence intervals for FMWT indices. This provided an objective way to determine which indices are statistically differentiable. However, we do not have data on the relationship between true abundance and the FMWT's relative abundance indices. I submit the following as a topic to be (1) considered when evaluating historical data analyses, and (2) evaluated further in 2006 and beyond because of its implications for the interpretation of results based on index trends.

Figure 1. Relationship between the striped bass townet survey indices and the striped bass fall midwater trawl indices for 1967-2004, and for just the post Bay-Delta Accord years (1996-2004).



Since 1967, there has been a strong statistical relationship between the relative abundance of 38-mm striped bass in the summer and the relative abundance of age-0 striped bass a few months later in the fall (Figure 1). This suggests that striped bass year-class strength This is a draft work in progress subject to review and revision as information becomes available.

is generally set by summer. However, consistently low abundance of striped bass in recent years is associated with a considerable decline in predictive ability. There are two possibilities. One possibility is that the trawls continue to track relative abundance well and the relationship has truly degraded due to changed summer habitat conditions, carrying capacity, etc. The other possibility is that the 'true' relationship between summer and fall abundance remains unchanged, but abundance is lower than what can be tracked efficiently by the FMWT program. In other words, maintenance of the high r^2 from the 1967-2004 relationship is dependent on occasionally having TNS indices > 10 and FMWT indices $> 1,000$. This has implications for POD-commissioned analyses such as those being done by Dr. Bryan Manly. In particular, our ability to statistically discern step-changes in the relative abundance of already depressed populations.

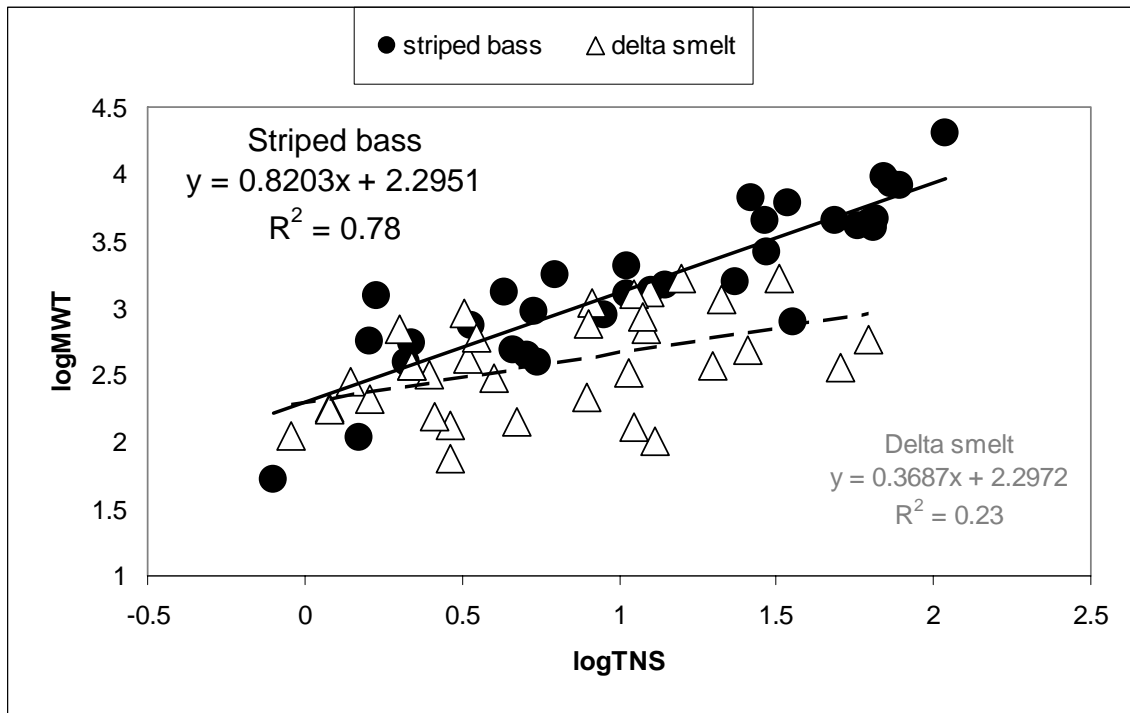
These results for striped bass also may have implications for delta smelt, which has commonly had TNS indices > 10 , but seldom had FMWT trawl indices $> 1,000$. There is a very weak relationship between delta smelt summer abundance and fall abundance (Figure 2). BJ Miller (unpublished report/EET presentation) recently found a delta smelt prey covariate that increases the r^2 for delta smelt's summer-fall relationship to something comparable to that of striped bass. Miller's analysis provides evidence that summer prey availability and hence carrying capacity is a primary driver of adult delta smelt abundance. In contrast, Kevin Fleming (unpublished CALFED Science presentation) found inverse LOWESS regression lines described delta smelt summer abundance and spring/early summer exports. He posited that LOWESS regression allows us to see through the excessive random sampling error arising from low gear efficiency, allowing a relationship between water export during vulnerable early life stages and subsequent relative abundance to be discerned. These two interpretations lead to very different suggestions for species management. They probably cannot be resolved without further study of gear efficiency.

References

Kimmerer, W., and M. Nobriga. 2005. Development and evaluation of bootstrapped confidence intervals for the IEP fish abundance indices. Interagency Ecological Program Newsletter. In press.

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Figure 2. Summer versus fall relative abundance relationships for striped bass and delta smelt, 1967-2004.



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